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SPECIFICATION FOR THERMOMETER FOR WHIRLING PSYCHROMETERS

(First Reprint APRIL 1977)

UDC 536.51:501.508.71

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 2 *August* 1971

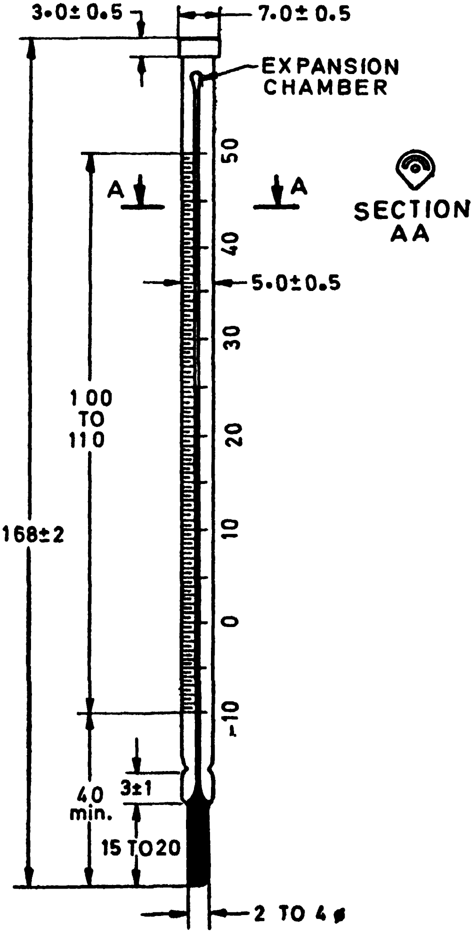
AMENDMENT NO. 1 MAY 1980

TO

IS : 6017 - 1971 SPECIFICATION FOR THERMOMETER FOR WHIRLING PSYCHROMETERS

Alteration

(*Page* 5, *Fig.* 1) — Substitute the following for the existing figure:



Length of Graduations

Short — 1·5 mm Medium — 2·5 mm Long — 4 mm

All dimensions in millimetres.

FIG. 1 THERMOMETER FOR WHIRLING PSYCHROMETER

(CDC 93)

Printed at New India Printing Press, Khurja, India

Indian Standard

SPECIFICATION FOR THERMOMETER FOR WHIRLING PSYCHROMETERS

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Indian Standard

SPECIFICATION FOR THERMOMETER FOR WHIRLING PSYCHROMETERS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 3 February 1971, after the draft finalized by the Laboratory Glassware and Related Apparatus Sectional Committee had been approved by the Chemical Division Council.

0.2 Psychrometer is the most common instrument for measuring atmospheric humidity. It consists essentially of two similar thermometers exposed side by side. One of these is an ordinary thermometer known as the 'dry-bulb' thermometer and the other (with its bulb covered by a single layer of muslin, moistened with water) is called the 'wet-bulb' thermometer. The temperature indicated by the wet-bulb thermometer is lower than that indicated by the dry-bulb thermometer because of the cooling caused by evaporation of water from the wet muslin. The relative humidity of air is calculated from the readings of the dry-and-wet bulb thermometers using appropriate psychrometric tables.

0.3 The psychrometers are either of the stationary screen type or of the portable ventilated type. In the whirling psychrometer (which belongs to the latter type) two similar thermometers are fitted side by side in a wooden frame and ventilation is provided by whirling the psychrometer rapidly by hand at the rate of about 3 to 4 rev/s to have an air speed of at least 4 m/s past the bulbs. This standard is intended for thermometers to be fitted in whirling psychrometers.

NOTE — Indian Standard specifications for stationary-screen and whirling psychrometers are under preparation.

0.4 This standard contains a clause **8.2** which provides for agreement between the purchaser and the supplier.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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*Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard prescribes the requirements for thermometer for use in whirling psychrometers.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 2627-1963* shall apply.

3. TYPE

3.1 The thermometer shall be of the liquid-in-glass solid-stem type with enamel back. They shall be in pairs of similar thermometers.

4. REQUIREMENTS

4.1 Materials

4.1.1 *Glass* — The glass tubing used in the manufacture of thermometers shall conform to the requirements laid down in IS : 4529-1968†.

4.1.2 *Thermometric Liquid* — Recommended thermometric liquid is pure, dry mercury, preferably alloyed with 8.5 percent (*w/w*) of thallium.

4.2 Construction

4.2.1 *Pattern* — The thermometer shall conform to the shape prescribed in Fig. 1.

4.2.2 *Stem* — No enlargement of bore shall be permissible in the graduated portion of the stem or within 5 mm from either end of the scale.

4.2.2.1 A small notch about 3 mm above the top of the bulb shall be provided on the stem for tying the muslin securely round the bulb.

4.2.3 *Bulb*

4.2.3.1 The bulb shall be cylindrical and in alignment with the stem. The bulb glass shall be stabilized before calibration of the thermometers.

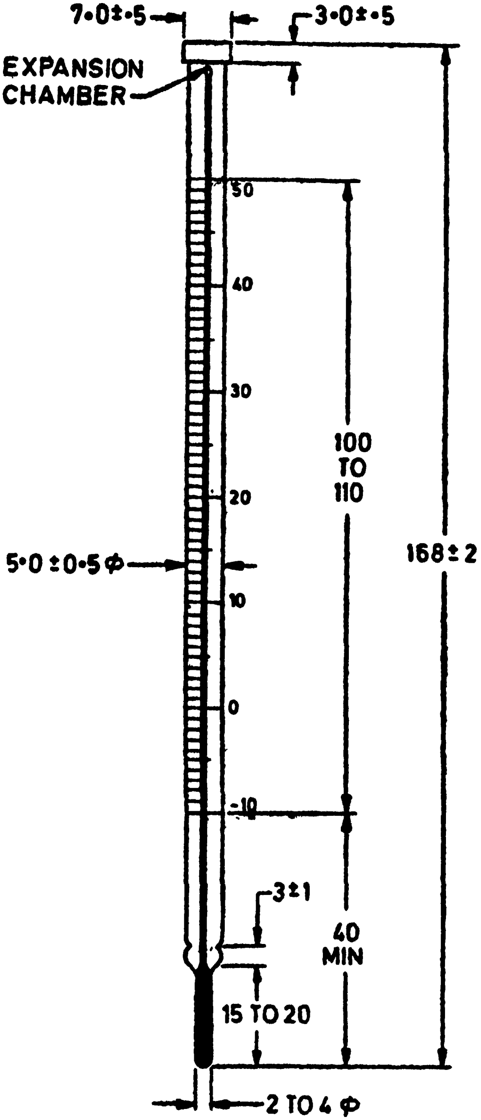
4.2.3.2 The shape and finish of the bulb shall be such as not to entrap the thermometric liquid.

4.2.4 *Top Finish* — The top of the thermometer stem shall end in a button as shown in Fig. 1. It shall have dimensions specified in the figure.

---

*Glossary of terms relating to liquid-in-glass thermometers.

†Specification for glass tubes for medical thermometers.



Length of graduation lines:
Short — 1·5
Medium — 2·5
Long — 4

All dimensions in millimetres.

FIG 1. THERMOMETER FOR WHIRLING PSYCHROMETERS

4.2.5 *Expansion Chamber* — The thermometer shall be so constructed as to withstand a temperature of 65°C without damage. An elongated or pear-shaped expansion chamber with a hemispherical top and without re-entrant shoulders shall be provided at the top end of the capillary in a line with the capillary bore to enable the thermometer to withstand the above temperature.

4.2.6 The thermometer shall be suitably annealed before graduation.

5. DIMENSIONS

5.1 The thermometer shall conform to the dimensions shown in Fig. 1.

6. GRADUATION AND FIGURING

6.1 The thermometer shall be graduated for total immersion.

6.2 The graduation lines shall be clearly engraved on the stem at each half degree Celcius and shall be of uniform thickness not exceeding 0.15 mm. They shall be filled with black pigment.

6.3 The graduation lines shall be at right angles to the axis of the thermometer when the thermometer is viewed from the front in a vertical position They shall all start from an imaginary line parallel to the axis on the left hand side

6.4 The numerals —10, 0, 10, 20, 30, 40 and 50 shall be etched on the stem on the right hand side as shown in Fig 1.

6.5 The figures shall be placed in such a way that they are bisected by an extension of the line to which they refer; alternately, they shall be placed immediately above the extended line.

7. ACCURACY

7.1 Scale Error — The maximum permissible scale error at any point below 0°C shall be within $\begin{smallmatrix}-0\cdot3\\+0\cdot2\end{smallmatrix}\,^{\circ}\mathrm{C}$ and above 0°C within $\begin{smallmatrix}-0\cdot2\\+0\cdot1\end{smallmatrix}\,^{\circ}\mathrm{C}$.

7.2 Interval Error — The maximum change of error between two points separated by an interval of 17°C on the stem shall not exceed 0.3°C below 0°C and 0.2°C above 0°C.

8. MARKING AND PACKING

8.1 Marking

8.1.1 Each thermometer shall be marked legibly with the following information:

a) The letter '°C' near the top of the scale;

b) Maker's name or recognized trade-mark, if any, at the back of the thermometer; and

c) Serial number and year of manufacture.

8.1.2 The thermometer may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

8.2 Packing — Each thermometer shall be wrapped in a piece of thin tissue paper and packed in a circular cardboard case approximately 13 mm in diameter, alternately, they shall be suitably packed as agreed to between the purchaser and the supplier.

9. TESTING AND INSPECTION

9.1 Each termometer shall individually comply with all the requirements of this specification. The calibration tests shall be carried out in accordance with Indian Standard method of calibrating liquid-in-glass thermometers (*under preparation*).

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- Oils & fats, oleaginous seeds and fruits
- Painters' materials (miscellaneous)
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- Paper and pulp board packaging materials
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- Petroleum and petroleum products
- Photographic chemicals
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